$$p_0 = +22^s.2155, \quad q_0 = +17^s.3700 \quad \text{Bessel}$$
$$p = +22^s.2180, \quad q = +17^s.3712 \quad \text{Struve.}$$

By formula, the factor being 1 : 14656,

$$p - p_0 = +0^s.0010 + 0^s.0025 = +0^s.0035$$
$$q - q_0 = +0^s.0012$$

Gotha, 1879, *Feb.* 10.

Les longueurs du pendule à secondes à Poulkova, à St.-Pétersbourg et aux différents points de la Russie occidentale, corrigées de l'influence produite par la flexion des supports du pendule construits par M. Repsold. Par M. A. Savitsch, Professeur d'Astronomie à l'Université de St.-Pétersbourg.*

(*Abstract.*)

The paper is a sequel to the author's Memoir presented to the Royal Astronomical Society in 1872, and printed in their *Memoirs*, vol. xxxix., pp. 19–29. By the aid of the researches of Peirce, Cellerier, and Plantamour in regard to the flexibility of the supports of the pendulums as constructed by M. Repsold, he is at present able to give the lengths of the seconds pendulum for different points of Western Russia with more precision than in his Memoir of 1872. The corrected results are :—

Station.	Latitude N.			Longitude E. of Greenwich.			Length of Seconds Pendulum in Paris lines.
	°	′	″	h	m	s	
Tornea	65	50	43	1	36	54	441·2460
Nicolaistadt	63	5	33	1	26	26	441·1228
St. Petersburg	59	56	30	2	1	14	441·0254
Revel	59	26	37	1	39	1	441·0125
Dorpat	58	22	47	1	46	54	440·9697
Jacobstadt	56	30	3	1	43	4	440·8835
Vilna	54	41	2	1	41	12	440·8288
Belin	52	2	22	1	40	52	440·7203
Krementz	50	6	8	1	42	54	440·6467
Kamenetz-Podolsk	48	4	39	1	46	18	440·5778
Kischeneb	47	1	30	1	55	18	440·5212
Ismail	45	20	34	1	55	16	440·4413

* The Memoir will be printed *in extenso* in the *Memoirs* of the Society.—Ed.

The author remarks that the reversible pendulum and its tripod, constructed by M. Repsold, are very convenient for transport and differential observations of the length of the seconds pendulum in different places; but, to obtain the correct length in any particular place, recourse must be had to a series of observations difficult to execute with precision. He suggests that the pendulum should be suspended at a given place, as well from its actual tripod as from a solid support fixed in a wall, as by Captain Kater and other English observers. The comparison of the time of oscillation for these two methods of suspension would be sufficient to determine the correction depending on the flexibility of the tripod.

The Memoir is dated January 11, 1879.

On a New Method of determining Astronomical Refractions.

By David Gill, Esq.

The law of astronomical refraction is by no means known with certainty. Bessel and Nyren have, it is true, arrived at very similar results on different hypotheses, but the state of our knowledge of refraction (especially beyond 80° zenith distance) is not satisfactory.

The ordinary well-known method of determining refraction is to observe the zenith distance of stars at their upper and lower culmination. Then, with an assumed latitude of the Observatory and an assumed law of refraction, to calculate the polar distances, and finally to find such a correction to the assumed latitude and assumed law of refraction as shall reduce the sum of the squares of the residuals to a minimum. The whole question then becomes a very involved one, for it includes, besides an imperfectly known law of refraction, all the unknown errors of division of the circle, the errors of flexure, &c., which are so difficult to determine completely.

I think, therefore, that a perfectly independent method of determining the absolute refraction at any altitude, and which is entirely independent of any assumed law, is not only a great desideratum in practical astronomy, but a subject of much interest as a physical research. I therefore lay the following proposal before the Society in its present form with the hope of benefiting, in the after practical application of the method, by the suggestions of the Fellows.

To fix our ideas:

1. Let us suppose an Observatory situated on the Earth's Equator.

2. Let this Observatory be provided with an instrument on